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UNITED STATES DEPARTMENT OF AGRICULTURE
Cotton Ginning Laboratory
Stoneville, Miss.

ACE-120

Agricultural Marketing Service

Bureau of Agricultural Chemistry and Engineering

METHODS OF HUMIDIFYING COTTON GIN AIRBLAST NOZZLES

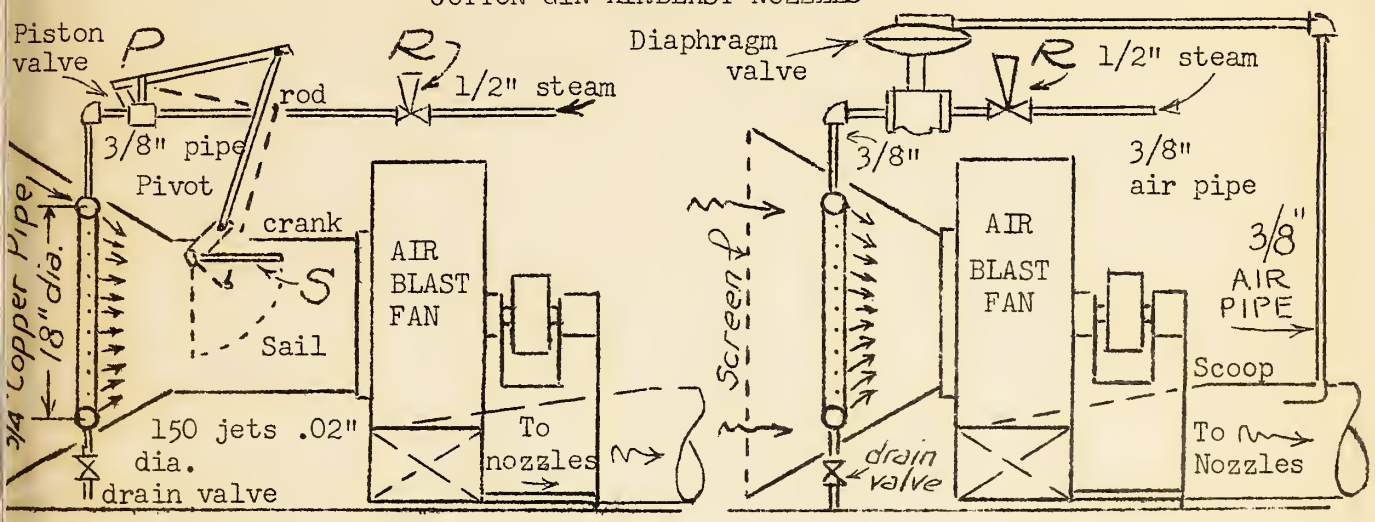

DIAGRAM OF AIRBLAST HUMIDIFIER USING PISTON VALVE

DIAGRAM OF HUMIDIFIER USING DIAPHRAGM VALVE

OPERATION: While the airblast fan reaches full speed, the galvanized metal sail, "S", is lifted by the flow of air and thus opens the piston valve, "P", by means of the crank, operating rod and lever. Steam (under working pressure up to 100 lbs. gauge) flows through the regulating valve, "R", to the jet holes in the copper pipe ring. There are 150 of these jet holes, each drilled .02" in diameter at 45 degrees to the plane of the ring to form a humidifying cone through which the airblast passes. The amount of steam admitted to the jets is regulated by the valve, "R". When the airblast fan stops, the sail, "S", drops by gravity and automatically closes the piston valve, "P".

The operation of the diaphragm valve with air scoop achieves the same results as the piston valve with sail and lever.

PERFORMANCE: With this device, the relative humidity of the airblast volume is increased to about 85% without condensation and is especially useful in connection with the artificial drying of cotton.

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The results of tests of this airblast humidifying method at the U. S. Cotton Ginning Laboratory seemed to indicate that when the staple length of the cotton was shortened by drying, any loss of length due to shrinkage of the fibers was partially restored by humidifying the doffing air or increasing its relative humidity by approximately 40%. In these tests, the process increased bale weight an average of 5 pounds, one-half of which was due to an increase in moisture content of the lint. The remainder of this increase apparently was associated with more efficient ginning by the saws being constantly subjected to damper air which perhaps lessened friction.